December, 1958

THE CHEMIST

VOLUME XXXV NUMBER 12

Dr. Leslie J. Todd, F.A.I.C.
Receives the Ohio Award.
(*See page* 509)

Merry Christmas

ONE ORDER

fills all your laboratory chemical needs at B&A

Simplify your buying and bookkeeping. Order *all* your laboratory chemical requirements from B&A's complete line—readily available from our coast-to-coast chain of warehouses, and 35 leading laboratory supply houses. Here's convenient, dependable "one-stop shopping." Plus the advantages of dealing with the country's foremost producer of laboratory and scientific chemicals.

Inorganic and Organic Reagents
The most complete, most preferred line in the country. B&A offers over 1,000 high-purity reagents to meet your every need. Outstanding for packaging, too!

"C.P." Acids
Widest possible selection from America's pioneer producer. More than 50 Acids are available in all preferred grades and strengths to fill every laboratory requirement.

Radio-Chemicals
B&A's extensive line includes organic and inorganic radioisotopes, including Carbon-14 labeled compounds and deuterated compounds.

Rare Earths
B&A regularly offers over 30 rare earth oxides and salts in experimental and commercial quantities. Others available on request.

Organic Chemicals
The complete line of Eastman Organic Chemicals as listed by Eastman Kodak Company is always available from B&A.

Biological Stains & Indicators
B&A also provides the full line of "National Quality" Stains and Indicators of Allied Chemical's National Aniline Division.

BAKER & ADAMSON® Laboratory Chemicals

B&A

Allied Chemical

GENERAL CHEMICAL DIVISION

40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte Chicago • Cleveland (Miss.) • Cleveland (Ohio) • Denver • Detroit • Houston • Jacksonville Kalamazoo • Los Angeles • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Portland (Ore.) • Providence • San Francisco • St. Louis • Seattle • Kennewick, Vancouver and Yakima (Wash.)

Plasticizer Data
TO HELP YOU CHOOSE THE RIGHT PLASTICIZER

this Harflex® Polymeric Plasticizer is permanent

Harflex 300 polymeric plasticizer

Non-migratory • Fast processing • Excellent dry blending • Good low temperature properties

Used with Vinyl Chloride Polymers and Copolymers, Polyvinyl Acetate, Synthetic Rubbers, Nitrocellulose, Cellulose Acetobutyrate, Polymethyl Methacrylate.

Can be used as sole Plasticizer

physical data

100% Modulus	1320 psi
Tensile Strength	2695 psi
Elongation	338%
Hardness, Shore A	80
T_f	−17.3°C.
Flux Time	45 seconds

heat stability (180°C.)

Initial Discoloration	15 min.
Maximum Discoloration	90 min.

extraction loss

Water	0.21 %
1% Soap	3.45 %
Mineral Oil	2.10 %

migration

Lacquer, 25°C., 14 days	Very slight softening
Varnish, 25°C., 14 days	No effect
Polystyrene, 60°C., 19 days	No effect

HARCHEM produces a full line of phthalate, adipate, sebacate and polymeric plasticizers. The Harchem Division laboratories will gladly assist you with your plasticizer problems, or will supply additional data including formulation test methods and formulation suggestions for any Harflex Plasticizer.

Address inquiries to Dept. H-43.25

THE KEY TO HARCHEM® BETTER PLASTICS

HARCHEM DIVISION

WALLACE & TIERNAN, INC.
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY
IN CANADA: W. C. HARDESTY CO. OF CANADA, LTD., TORONTO

The CHEMIST

Reg. U. S. Pat. Off.

Publication of

THE AMERICAN INSTITUTE OF CHEMISTS, INC.

60 East 42nd street, New York 17, N. Y.

Entered as second class matter April 8, 1936 at the Post Office at New York, N. Y., under Act of August 24, 1912. Second class postage paid at New York, N. Y. Issued monthly.

Subscription price, $2.00 a year to Members, $3.00 to Non-Members. Single copy, this issue, $0.25. Copyright, 1958 by THE AMERICAN INSTITUTE OF CHEMISTS, INC.

Vol. XXXV December, 1958 Number 12

THE AMERICAN INSTITUTE OF CHEMISTS

Council

Officers:

President, Dr. Emil Ott
President-elect, Dr. W. E. Kuhn
Secretary, Dr. Lloyd Van Doren
Treasurer, Dr. F. A. Hessel
Chairman of the Board, Dr. H. B. Hass

Councilors:

Dr. E. I. Becker, *New York Chapter*
Dr. J. A. Bjorksten, *At-Large*
Dr. E. B. Carmichael, *Alabama Chapter*
Dr. C. H. Fisher, *At-Large*
Dr. H. L. Fisher, *At-Large*
Dr. M. H. Fleysher, *Niagara Chapter*
Dr. D. M. Gans, *Ohio Chapter*
Dr. L. A. Hall, *At-Large*
K. M. Herstein, *At-Large*
Dr. D. B. Keyes, *At-Large*
Dr. S. D. Kirkpatrick, *At-Large*
H. A. Levey, *Louisiana Chapter*
Dr. A. Ernest MacGee, *Midwest Chapter*
Dr. O. E. May, *Piedmont Chapter*
Dr. K. W. Newman, *Western Chapter*
Dr. J. H. Nair, *Past President*
Dr. L. H. Reyerson, *At-Large*
M. Sittenfield, *Pennsylvania Chapter*
B. E. Schaar, *Chicago Chapter*
Dr. W. R. Sullivan, *New Jersey Chapter*
G. G. Taft, *New England Chapter*
Dr. M. Tishler, *At-Large*
Dr. A. H. Warth, *Baltimore Chapter*
Dr. C. J. Wessel, *Washington Chapter*
Dr. J. L. Wilson, *Twin City Chapter*

THE CHEMIST

Editor, V. F. Kimball

Advisory Board:

Dr. Ray P. Dinsmore
Lawrence H. Flett
Dr. Bernard S. Friedman
Richard L. Moore
Dr. Walter J. Murphy
Dr. W. George Parks
Dr. L. F. Pierce
Dr. Malcolm M. Renfrew
Dr. William J. Sparks

Contributing Editors:

M. R. Bhagwat
D. H. Killeffer
Dr. Frederick G. Sawyer
Florence E. Wall
Martin B. Williams

Department Editors:

Dr. Ed. F. Degering, *Condensates*
Doris Eager, *Opportunities*
Dr. Rudolph Seiden, *Chemical Books Abroad*

• • •

Deadlines for THE CHEMIST: For the February issue the deadline is January 15.

• • •

THE AMERICAN INSTITUTE OF CHEMISTS does not necessarily endorse any of the facts or opinions advanced in articles which appear in THE CHEMIST.

IN THIS ISSUE

Editorial:
- AIC and ACS Cooperate in Professional Objectives ... 505

Special AIC Announcements:
- Joseph Harrisson to Be Honored ... 506
- Committee on Chapter Activities Expands ... 506
- Committee on Professional Education Invites Reports ... 506
- Prize Essay Announced ... 506

Will You Come ... 507

For the Gifted Student, What? *Dr. Leslie J. Todd, F.A.I.C.* ... 509

Leslie Todd—Distinguished Professor ... 514

Presentation of the Ohio Award ... 515

Student Medalists of 1958 ... 516

The Function of a Scientist in the Chemical Profession, *Dr. C. G. Overberger, F.A.I.C.* ... 519

From Test Tube to Tank Car, *Dr. Sydney Steele* ... 523

Chemistry as a Profession (Prize Paper), *Robert B. Smith* ... 529

About AIC Members ... 532

Chapter Committees ... 535

For Your Library ... 536

Communications:
- Numerology? ... 537
- Worthwhile Article ... 537
- The Value of Personal Contact ... 537
- Dissolvable Paper ... 537

Dedication Meeting of the Midwest Chapter ... 538

Opportunities ... 538

New Piedmont Chapter Holds Charter Meeting ... 539

Chapter Areas ... 540

TO COME IN JANUARY

In ancient days, man tried to control the sun . . . *it is returning to the Northland* . . . Today, having learned his limitations, he seeks for ways to use solar energy. "A Chemist Looks at Solar Energy" will be presented by Merritt L. Kastens, F.A.I.C., of Stanford Research Institute, Menlo Park, Calif. Karl M. Herstein, F.A.I.C., president, Herstein Labs., New York, N.Y., who received the 1958 Honor Scroll of the New York Chapter, is the author of "Chemistry—A Profession and a Way of Life."

Recommended Suppliers and Services

Baker & Adamson, Allied Chemical ... Inside Front Cover
Norman Applezweig Associates ... 532
Bios Laboratories, Inc. ... 528
Farrand Optical Co., Inc. ... 504
Food Drug & Research Labs., Inc. ... 534
Gordon & Campbell ... 537
Harchem Div., Wallace & Tiernan, Inc. ... 501
Johns-Manville ... Inside Back Cover
LaWall & Harrisson ... 538
The Lento Press ... 532
John J. Levenson Jr. & Associates ... 528
Arthur D. Little, Inc. ... 508
Molnar Laboratories ... 518
Phoenix Chemical Labs. ... 518
Lucius Pitkin, Inc. ... 533
Robinette Research Labs. ... 534
Rosner-Hixson Laboratories ... 535
Foster D. Snell, Inc. ... 535
R. Steckler Laboratories ... 533
Truesdail Laboratories ... 506
U.S. Stoneware ... Outside Back Cover
U.S. Testing Company ... 536

FARRAND® *Master* DIFFRACTION GRATINGS

Farrand Gratings, produced in our own plant on the FARRAND-STRONG Ruling Engine, are the world's most precise!

TYPE: Master, Plane Reflection.

SIZE: Ruling 5" wide x 2.8" long.

LINES PER INCH: 14,400.

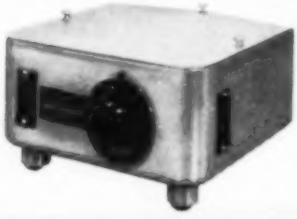
EFFICIENCY: 65-85% of Incident Energy in Blazed Region.

GHOST INTENSITY: Less than 0.1% in First Order of 5500 Å.

RESOLUTION: 100% of Theoretical in Third Order or Better.

HIGH ENERGY • RESOLUTION • DISPERSION AND SPECTRAL PURITY.

Provide Greater Efficiency for FARRAND® MONOCHROMATORS

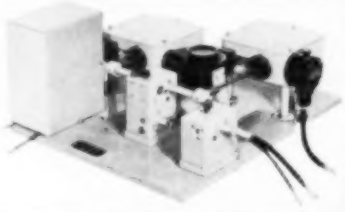


High resolution and unusual versatility. Small, compact and convenient. Suitable for a wide variety of applications.

Ultraviolet	**220-440 mμ**
Uv-Visible	**220-650 mμ**
Visible	**400-700 mμ**
Infrared	**700-1400 mμ**
Infrared	**700-2800 mμ**

For complete details, Bulletin No. 811

And Higher Resolution for FARRAND® SPECTROFLUOROMETERS



For Assay, Identification and Analysis of **FLUORESCENCE—FLUORESCENCE AND TRANSMITTANCE — FLUORESCENCE AND REFLECTANCE** in the Ultra Violet, Visible and Infrared Regions.

Bulletin No. 820 describes manual, automatic recording and oscilloscope models.

FARRAND OPTICAL CO., Inc.

BRONX BLVD. & EAST 238th STREET • NEW YORK 70, N. Y.

Engineering Research • Development Design • Manufacture

FOCI TRADE MARK

Precision Optics, Electronic and Scientific Instruments

EDITORIAL

AIC and ACS Cooperate in Professional Objectives

THE recent decision of the Committee on Professional Relations and Status of the American Chemical Society to "develop a broad program designed to elevate the professional status of chemists and chemical engineers" is good news, and a most encouraging sign that interest in professional matters is accelerating. With such cooperation from other societies, the goal of full professional acceptance is closer.

As reported in *Chemical & Engineering News* (Oct. 27, 1958), the ACS Board of Directors requested its Committee on Professional Relations and Status to "develop a means of official liaison" of the Society with the AIC. The Committee recommends an exchange of liaison representatives between the Committee on Professional Relations and Status and the national AIC Council. We welcome this opportunity to exchange ideas on matters affecting the profession.

This ACS Committee also recommends to the ACS Board that an editorial policy be adopted providing for the use of academic titles for chemists and chemical engineers. The AIC has always encouraged the use of academic titles, observing them in its own publications and on correspondence, as one way of reminding the public that chemists and chemical engineers are persons educated at university level to be professionals. An extension of this practice will enhance the effect on the public.

Also, the ACS Committee, in its program, plans to include the "development of a model employment agreement and of a code of ethics." Here too, the experience of the AIC will prove useful. Since its founding in 1923, the AIC has proposed several employment agreements. A recent one was published in the November issue of THE CHEMIST (page 483). Revisions to this employment agreement have now been proposed by a joint committee from the New York AIC Chapter and the New York ACS Section. These revisions are currently being studied by our Committee on Employer-Employee Relations for report to the AIC Council. For thirty-five years, AIC members have subscribed to our Code of Ethics, and this experience also will be most valuable to any group concerned with professional ethics.

We look forward to wider interest and achievement through mutual effort.

Special AIC Announcements

Joseph Harrisson To Be Honored

Dr. Joseph W. E. Harrisson, F.A.I.C., director, LaWall & Harrisson Research Labs., Philadelphia 3, Pa., will receive the Honor Scroll of the Pennsylvania AIC Chapter, Jan. 6, 1959, at a meeting at the Penn Sherwood Hotel, Philadelphia. Dr. Harrisson became a Fellow of the AIC in 1925, and has long been active as past vice president, member of the Council, on many Committees, the Pennsylvania Chapter, and as the AIC delegate to the American Board of Clinical Chemistry.

Committee On Chapter Activities Expands

The following new members have been added to the Committee on Chapter Activities, Martin B. Williams, chairman, informs us:

Dr. John J. Bohrer
Dr. Alfred E. A. Hudson
Norris W. Matthews
John H. Nair, III
Dr. L. F. Pierce
Dr. Ludwig Rosenstein
Ray F. Seifert
Dr. S. C. Spaulding, Jr.
Clark E. Thorp
Perry G. Vlacos

This Committee will welcome additional AIC members who would like to work with it on the organization of Chapters or to cooperate with existing Chapters. For information about the Committee's recommendations for Chapter areas, see page 540.

Committee On Professional Education Invites Reports

The Committee on Professional Education invites news reports about educational experiments being carried out over the country for the improvement of our scientific education, especially those for the improvement of preparation of high school students for college training. Please send information to the chairman of the Committee: Karl M. Herstein, Herstein Labs., Inc., 44 New St., New York 4, N. Y.

Prize Essay Announced

The Committee on Student Medals announces that the paper on "Chemistry as a Profession," written by Robert B. Smith, of Vista, California, has been chosen as the best essay submitted in the Student Medalist Essay Contest. Read it on page 529.

TRUESDAIL LABORATORIES, INC.
CHEMISTS
BACTERIOLOGISTS • ENGINEERS
Write for Publication "CHEMISTRY IN ACTION," on letterhead
4101 No. Figueroa St.
Los Angeles 65, Calif.
CApitol 5-4148
Bay Area Affiliation
(Air Pollution Investigations)
624 Sacramento St.
San Francisco, Calif.
Hawaiian Division,
Honolulu
• Applied Research & Development
• Consultation
• Analyses
• Environmental & Mechanical Testing

Will You Come

Dec. 2, 1958. Niagara Chapter Meeting. Niagara Falls, N. Y. Speaker. Dr. Emil Ott, AIC President. For information, Dr. Howard W. Post, University of Buffalo, Buffalo 14, N. Y.

Dec. 4, 1958. Pennsylvania Chapter. Engineers' Club, Philadelphia, Pa. Dinner 6:30 p.m. Program 8:00 p.m. Speaker, James Stack, A.C.S. News Service, "Presenting the Chemist to the Public." For reservations: Dr. W. E. Langeland, Wyeth Institute, Radnor, Pa. (Murray 8-4400).

Dec. 5, 1958. Alabama Chapter. Joint meeting with Alabama Section, American Chemical Society. Bankhead Hotel, Birmingham, Alabama. Social hour at 6; dinner at 7; talk at 8. Speaker Harold A. Levey, Sr., Hon. AIC, president, American Products Mfg. Co., New Orleans, La. Subject, "The Chemist and The Employer." For information: Dr. Charles E. Feazel, Southern Research Institute, Birmingham. (FAirfax 3-6592), or Martin Williams, Army Rocket & Guided Missile Agency, Redstone Arsenal, Ala. (JEfferson 6-4411, ext. 3795 or 3736).

Dec. 9, 1958. National AIC Council and Board of Directors. The Chemists' Club, 52 E. 41st St., New York 17, N. Y. Board meets at 5:30 p.m. Council meets at 6:00 p.m.

Dec. 9, 1958. Washington Chapter. Luncheon 12:15 p.m. O'Donnell's Sea Grill, 1223 E. St., N.W., Washington, D. C. Speaker, Dr. Burton W. Adkinson, head, Office of Scientific Information, National Science Foundation, "Documentation in Science."

Jan. 6, 1959. Pennsylvania Chapter. Penn Sherwood Hotel, Philadelphia, Pa. Honor Scroll Award dinner 6:30 p.m. Program 8:00 p.m. Presentation of the Honor Scroll of the Chapter by AIC President Ott, to Dr. J. W. E. Harrisson, of LaWall & Harrisson, Philadelphia, Pa. For reservations: Dr. W. E. Langeland, Wyeth Institute, Radnor, Pa. (Murray 8-4400).

Jan. 8, 1959. New York Chapter. Honorary Membership Meeting. Hotel Shelburne, 37th St. and Lexington Ave., New York, N. Y. Social Hour 5:30 p.m. Dinner 6:30 p.m. Program 7:30 p.m. Honorary Membership Recipient, Dr. Foster D. Snell, president, Foster D. Snell, Inc., New York, N. Y. Speaking for Dr. Snell as a person: Dr. Donald B. Keyes. Speaking for Dr. Snell as a chemist: Cyril S. Kimball, executive vice president, Foster D. Snell, Inc. Presentation of Honorary Membership: Dr. Emil Ott, AIC president. Acceptance Address: "The Independent Consultant and Independent Laboratory as a Professional Activity." Reservations (Dinner $6.25 in advance; $7.00 at the door), Robert R. Dean, Westvaco Chlor-Alkali Div., 161 E. 42nd St., New York 17, N. Y. (MU 7-7400).

Jan. 14, 1959. Chicago Chapter. Honorary Membership Meeting. Furniture Club of America, 667 McClurg Court, Chicago, Ill. Reception 6:00 p.m. sponsored by The Griffith Labs., Inc. Dinner 7:00 p.m. Honorary Membership Recipient, Dr. Lloyd A. Hall, F.A.I.C., technical director, The Griffith Labs., Inc. Program: Speaking for Dr. Hall as "The Citizen," the Hon. Richard J. Daley, Mayor of Chicago. Speaking for Dr. Hall as "The Chemist," F. Willard Griffith, executive vice president, The Griffith Labs., Inc. Presentation of Honorary Membership: Dr. Emil Ott, AIC president. Acceptance Address: "Catalyst for Better Living." Reservations: Send check or money order for $5.00 to Harry J. Pappas, 525 So. Madison Ave., La Grange, Ill.; or telephone Miss Virginia Cronin, Universal Oil Products, ROdney 3-6000, Ext. 516.

Jan. 15, 1959. Western Chapter. Social meeting, dinner, and plant tour, Schlitz Brewery, Van Nuys, California. For information, Stuart R. Garnett, 506 W. Almond St., Compton 4, Calif.

Feb. 1959. Niagara Chapter Meeting. Day and details to be announced.

Feb. 5, 1959. Pennsylvania Chapter. Luncheon Meeting, Philadelphia, Pa. 12:15 noon. Speaker, C. P. Neidig, White Weld & Co., "The Chemist and the Investor." For reservations, Dr. W. E. Langeland, Wyeth Institute, Radnor, Pa. (Murray 8-4400).

Feb. 6, 1959. New York Chapter. Joint meeting with New York Section of the American Chemical Society. Place and time to be announced. Speaker, Wallace

R. Brode, scientific advisor to the Department of State. Subject: "Government Policy. Why the Chemist Should Contribute." (To be discussed: Professional responsibility of the chemist. Need for the scientific approach. How he can contribute to local, state, and federal policy. Benefits to the chemist . . . to commerce . . . to society.)

Spring, 1959. (Date and details to be announced). Western Chapter. Dinner-dance, "just to prove chemists are people and can have fun." For information, Stuart R. Garnett, 506 W. Almond St., Compton 4, Calif.

March 5, 1959. Pennsylvania Chapter. Dinner. Engineer's Club, Philadelphia, Pa. Speaker and topic to be announced. For information: Dr. W. E. Langeland, Wyeth Institute, Radnor, Pa. (Murray 8-4400).

April, 1959. Niagara Chapter Meeting. Day and details to be announced.

April 9, 1959. Pennsylvania Chapter. Dinner meeting. Pittsburgh, Pa. Speaker, Dr. Emil Ott, AIC President, "Professional Obligations of the Chemist."

Apr. 16, 1959. New York Chapter Meeting. Bogert Room, The Chemists' Club, 52 E. 41st St., New York, N. Y. Social Hour 5:30 p.m. Dinner 6:30 p.m. Address 7:30 p.m. Speaker: Earl Ubell, Science editor, *New York Herald Tribune*. Subject: "Community Recognition —How the Chemist Can Achieve It." (To be discussed: Professional responsibility of the successful chemist. Public relations techniques for obtaining recognition. Working with editors . . . with others who contribute to the chemist's recognition. Benefits to the chemist . . . to the profession . . . to society) Reservations (Dinner $4.90. No charge to those attending address only), Robert R. Dean, Westvaco Chlor-Alkali Div., 161 E. 42nd St., New York 17, N.Y. (MU 7-7400).

May 6-8, 1959. 36th Annual AIC Meeting. Hotel Traymore, Atlantic City, N. J. The New York and New Jersey Chapters will be our hosts. Theme: "The Chemist and Engineer in Our Economy."

May 7, 1959. Pennsylvania Chapter. Dinner 6:30 p.m. Program 8:00 p.m. Engineers' Club, Philadelphia, Pa. AIC Student Award Night. Speaker and topic to be announced. For reservations: Dr. W. E. Langeland, Wyeth Institute, Radnor, Pa. (Murray 8-4400).

May 28, 1959. New York Chapter. Honor Scroll Award Meeting. Hotel Shelburne, 37th St. and Lexington Ave., New York, N. Y. Social Hour 5:30 p.m. Award recipient and speakers to be announced.

June, 1959. Niagara Chapter Meeting. Date and details to be announced.

May, 1960. (Dates to be announced.) 37th Annual AIC Meeting. Minneapolis, Minn. The Twin City Chapter will serve as host.

May 11-12, 1961. 38th Annual AIC Meeting. Statler Hotel. Washington, D. C. The Washington AIC Chapter will be our host.

Arthur D. Little, Inc.

ADL offers experience and capability in:

- Corporate Planning and Organization
- Advanced Research and Engineering
- Product Research and Development
- Production Engineering
- Market Analysis and Sales Planning

ADL scientists and engineers work closely with client organizations in performing assigned work through any desired stage of development.

Consultants to Industry
SINCE 1886

Cambridge • New York • Chicago • Washington
San Francisco • San Juan • Edinburgh

The new $5-million Administrative and Research Center of International Minerals and Chemical Corp., was opened at Skokie, Ill., on September 8.

For the Gifted Student, What?

Dr. Leslie J. Todd, F.A.I.C.

Department of Chemistry, Kent State University, Kent, Ohio

(Presented when the author received the Ohio Award of 1958, at the Ninth Annual Meeting of the Ohio AIC Chapter, Fort Hayes Hotel, Columbus, Ohio.)

FOR many years I have been interested in the problem presented by the gifted student. Almost weekly there are articles or references in newspapers and magazines concerning our present educational problems. Recently members of our own INSTITUTE met in Cleveland for a sectional discussion of topics of interest to chemists and chemical engineers. The one chosen above all others was what our members of this Northeastern part of Ohio could do about the present condition of science teaching in the high schools.

Chemists, chemical engineers, and all the citizens of our nation not in the educational profession, are becoming aroused about the situation. This is just what is needed. We in the educational profession have recognized the problem for years and have done everything possible to arouse the public. But the Russians by one act, were able to do what we were unable to do in years of effort. It is becoming quite popular to criticize our schools. . . . But if you are dissatisfied with the present state of our schools, so am I and so are many others.

Much has been accomplished in our state in developing special schools and techniques for helping retarded children. I am heartily in favor of everything that can be done to help such children. But in how many communities has anything been done for the gifted child? Some cities have made some effort in that direction, but it is not a state-wide practice. And yet it is these children who have been endowed by nature to create the new ideas, the new theories, the new inventions on which the progress of our civilization rests. If we are to hold our leadership in the world, or even keep up with other progressive nations, it rests upon the shoulders of these boys and girls who have this creative gift.

However, Carl Pacifico believes that there is no creative thinking, if one means by it the ability to imagine something completely different or foreign to one's experiences. He believes that the only information present in the human brain is that which arrived through the senses and that which is formed by various interconnections of this basic information. If this is true, it is fundamental to an understanding of creative thinking, and it gives many of us, who may believe we are not particularly endowed with the gift of creative thinking, an incentive to get busy and be

more creative. This man also believes one cannot imagine anything not already recorded on his brain. He believes that one who wishes to increase his own creative powers must not be concerned with details and that young brains are much more alert for opportunities of creativity. How then can one explain the above contradictions concerning creative thinking? Environment is important in the development of human beings. Some children grow in an environment which develops creative thinking, while others live in an environment that hampers it.

I was interested in what to do with the gifted student before it was popular to be. I have had a little experience with gifted students. In a college in West Virginia, where I taught from 1931 to 1946, we had such a problem sent to us in the Chemistry Department. The boy was a freshman in high school. He was taking general science and annoying his teacher with serious questions about chemistry.

We gave him the comprehensive chemistry test designed to be taken after one year of high school chemistry. He scored around 85% with some of his mistakes being those of simple algebra. After presenting his case to the State Superintendent of Schools, we received special permission for him to take college chemistry along with regular college students during summer school, and to receive regular college credit for the work. That summer he completed the first year college course in chemistry with a grade of B and did it easily. The next summer, in analytical chemistry, he made a B in qualitative and an A in quantitative analysis. In the first week of his quantitative analysis, I had my first serious talk with him about the quality of his work. His first unknown was worth a B and he remarked that B was a pretty good grade. I told him that he should not be satisfied with anything less than the best he could do; that he knew what he wanted to be in the future, and that a B grade was not good enough for anyone who could do better, particularly when he wanted to be a research chemist. I never had to remind him of this again. He went back and did the analysis over with an A grade, and so were the rest of his analyses that summer. The next summer, he took organic chemistry, earning an A for each semester's work. I would like to finish this story by saying that he is now a famous research chemist, but the summer he graduated from high school, I left that position and I have not heard from him since.

We in the educational profession have recognized this problem for many years. Recently a two-day conference was held in a neighboring university. At this conference, a survey of many colleges and universities showed that no easy, sure way has been found to successfully solve it.

The most wide-spread practice of giving gifted students the chance to develop beyond the average of their college class is an Honors Program. This has been used by some educational institutions for many years and by many institutions more or less intermittently. It has never been too popular with students, and has not been considered too successful by those using it. It generally applies to the last two years of the regular college course. There are many variations, some applying only to the major field of study; others applying to the entire last two years of college work. Harvard University is studying an Honors Program to cover the entire student body except the science students. At the end of the sophomore year an examination would determine who would gain acceptance into the honors program. Students in this program would take but three courses in their junior and senior years, plus tutorial for credit. This university in the future may be divided between men going to college and scholars in pursuit of knowledge.

Wooster College requires all seniors to write a thesis on a subject chosen in their junior year under the personal direction of a member of the faculty. In science this results in a research problem and a written report of the results of the research. Our chemistry colleagues at Wooster tell us that it adds considerably to their teaching load, requires a larger chemistry staff, but is worth the extra work it demands. I know something of the extra work required to take care of students doing individual problems. I have two this quarter, in addition to my regular teaching load. One comes between 8:00 and 9:00 a.m. each Monday, Wednesday, and Friday for conference; the other on Tuesday and Thursday. But even a short conference each day at this time breaks into whatever else I have planned, and I do not always look forward to the interruption with pleasure.

For several years it has seemed to me that we at Kent State should do something to find, attract and develop the gifted students in our area of Ohio. We could get acquainted with each chemistry teacher in the area's high schools and get to know the outstanding chemistry students in his class with the hope of influencing these students to go to some college or university. A committee of our staff did make up quite an attractive brochure describing the equipment and members of our staff. This was sent to many high school chemistry teachers or personal advisors.

An alumni magazine recently was devoted almost entirely to a special report on American Higher Education 1958. Not only must higher education plan to serve more students, but it is faced, more than ever, with the problem of not losing sight of its extraordinary students, its gifted stu-

dents. When one looks over the almost endless line of students at registration time and realizes that there may be a genius or two there, it can be tragic if we fail to find and develop this genius or two in our midst. Educators ask themselves, "How can you educate everyone who is ambitious and has the basic qualifications, and still have time, teachers, and money to spend on the unusual boy or girl? Are we being true to our belief in the individual if we put everyone into the same mold, ignoring human differences? Besides, let's be practical about it: "Doesn't this country need to develop every genius it has?"

For the last two years the University of Kansas has been using statewide examinations to spot these exceptional high-school boys and girls early. It invites high school principals to nominate candidates for scholarships from the upper 5 per cent of their senior classes. It brings promising students to its campus for further testing, screening and selection. When they arrive as freshmen, they find themselves in touch with a special faculty committee. They are allowed to take as large a bite of education as they can swallow, and they may enter junior and senior-level courses if they can handle the work. The force of this program has been felt down into the high schools, too, stimulating teachers and attracting to the university strong students who might otherwise be lost to it.

It has long been a hope of mine that the well-prepared exceptional students be separated from the average students. I realize that this may cause the poor student to feel inferior, but I have never found adults to be particularly sympathetic to lazy, inferior workmanship, and I see no reason why such students should be sheltered from life in an adult world. These exceptional students should be offered a course in beginning chemistry that they would find interesting, challenging and exciting.

Last December, two of us were asked to make up a committee to develop a special four-year curriculum for such students. We had hoped to make this a class of students attracted to our university by industrial scholarships. Within two weeks after we started on this curriculum, Columbia University announced a six-year program for gifted students, at the end of which they might have earned the doctor's degree in chemistry. Columbia plans to start their curriculum in September. Ours will not be ready then.

One staff member argues against this separation of the best students entering college with high school chemistry, saying that by the end of the first quarter one could not distinguish these from the best ones entering without high school chemistry. In most cases, he is right. But upon more serious consideration, this only shows up a real weakness in our edu-

cational system. The well-prepared, gifted student has loafed until the others caught up and in doing this has learned bad habits, or at least not good habits, of study in his first weeks at college.

For the last three Septembers, I have been looking over the records of students in my two sections of beginning chemistry, trying to find outstanding students. Sometimes I have announced in my classes that I would be happy to talk with anyone who had a good understanding of elementary chemistry and was interested in learning beyond the level of this course. No one volunteered. I even approached three boys, who, from their records, might be interested in new experiments in chemistry. One wanted to be a physics major and was not interested. The second worked every afternoon and did not have time. The third was not interested.

In this special report on American Higher Education 1958 are listed nine items or conditions that need to be improved. Most would cost money to put into effect. Most of us believe we are spending large sums on education. We are, with much of it spent on buildings and equipment which is important but not entirely necessary. I remember listening to a college president, saying time and again, "Give me the library, the laboratories and the faculty and I will build an outstanding educational institution."

A fundamental trouble with our educational system is also a fundamental trouble with our society as a whole. Hard work has lost its popularity. Too many of us are looking for the easiest way to do things; the easiest kind of a job, with the most coffee breaks, the greatest security, the highest pay and guaranteed increases. Last year we were at the peak of several years of an expanding economy . . . Our society can not live in such an economy without it affecting the school children . . .

What can we do for the gifted student in our educational institutions? Much is being done in a few colleges and universities but there is room for improvement. More interest should be placed on finding these boys and girls early in their educational experiences and instilling in them a desire for knowledge. A closer relationship should be developed between the high schools and the institutions of higher learning. Teaching at all levels should lay more stress on the development of the mind and the accumulation of knowledge for its own sake. A boy or girl with an outstanding mind, well-trained to solve difficult problems, should rank higher than the star foot-ball player. And above all the gifted student in college needs the personal attention and guidance of a faculty member and the chance to take as large a bite of education as he can swallow.

Leslie Todd — Distinguished Professor

(A professor can never better distinguish himself in his work than by encouraging a clever pupil, for the true discoverers are among them, as comets amongst the stars. —*Carl Linnaeus* [1707-1778])

Dr. Will S. Thompson

Head, Chemistry Department, Kent State University, Kent, Ohio

(Presented when Dr. Todd received the Ohio Award of 1958, at the Ninth Annual Meeting of the Ohio AIC Chapter, Columbus, Ohio.)

LESLIE J. TODD grew up on a farm near Hendrysburg in Belmont County, Ohio. His undergraduate schooling at Muskingum was interrupted for two years while he taught at Flushing High School. After graduation from Muskingum with a major in chemistry in 1924, he taught chemistry and other sciences in the Zanesville, Ohio, high schools for three years. He decided to continue his chemical education at Columbia University. There he received the Master's degree in 1928 and the Ph.D. in 1931.

His thesis research at Columbia, under the direction of Prof. A. W. Thomas in the field of colloid chemistry, was an interesting and careful investigation into the nature of aluminum oxybromide hydrosols. This field has remained one of Leslie's strong interests through all of the diversions and diversities of an extensive teaching career. He is a skillful technician and a meticulous experimentalist. Generations of chemistry students have learned from him an appreciation of precision and fine laboratory technique in combination with the fundamental principles of the science of chemistry .

During his graduate student days in New York, Leslie was an assistant on the Columbia University instructional staff and also taught chemistry at St. Francis College in Brooklyn. In 1931, the Todd family moved from New York to Huntington, W. Va., where Leslie was head of the Chemistry Department of Marshall College. The growth of that department during the following fifteen years is a monument to his efforts. Many of the Marshall College graduates of this period, who have gone on to careers in chemistry, owe their interest in this field and their choice of it to the persuasiveness and enthusiasm of Prof. Todd. How effective this is may be seen from the fact that 100% of his children (two sons) are now chemists. One is a Ph.D. from Johns Hopkins and the other is a Ph.D. from Yale. Who can equal that unbeatable percentage?

One of the Todd sons returned to his father's Alma Mater (Columbia) for his graduate work but ended up at Yale when his research professor transferred there at about the midpoint in the research problem.

In 1946, Dr. Todd (Dr. Todd *senior,* since you can easily get a quorum around the Todd house by shouting "Dr. Todd") transferred to Indiana University where he was in charge of the freshman chemistry program. In 1949 he moved to Kent State University, where he is professor of chemistry.

Leslie takes an active interest in local church affairs and the Lions Club. His hobbies include music, bridge, and gardening. This spring, however, his favorite outdoor activity is supervising the construction of a new home in Kent. He is a member of Sigma Xi, Phi Lamba Upsilon, the American Chemical Society, the A.A.A.S., the Masons, and a Fellow of the AIC. At heart he is always a teacher, and he derives genuine enjoyment from stimulating the interest and enthusiasm of students for the wonders of chemistry.

Presentation of the Ohio Award

DR. LESLIE J. TODD, professor, Chemistry Department, Kent State University, Kent Ohio, received the Ohio Award of the Ohio AIC Chapter, at its Ninth Annual Meeting, held May 24, 1958, at the Fort Hayes Hotel, Columbus. Donn F. Siddall, director, Chamberlain Labs. of U. S. Stoneware, Cleveland, presided.

Dr. Henry B. Hass, president of the Sugar Research Foundation, New York, N. Y., and then retiring AIC president, spoke on "It's Your Institute." Dr. Todd was introduced by Dr. Will S. Thompson, head of the Chemistry Department of Kent State University. Dr. Todd accepted the award with an address, "For the Gifted Student—What?" (See preceding pages.)

The guest speaker was Dr. Chauncey Leake, assistant dean of the Medical School of Ohio State University. His subject was, "Chemicals Affecting Mood and Behaviour."

The officers and directors of the Ohio Chapter for the 1958-1959 fiscal year were then introduced. They are, *Chairman,* Dr. Joseph F. Koffolt, Department of Chemical Engineering, Ohio State University, Columbus. *Chairman-elect,* Dr. James D. D'Ianni, assistant to vice president, The Goodyear Tire & Rubber Co., Akron. *Secretary-treasurer,* Dr. Thomas R. Sweet, Ohio State University. *National Council Representative,* Dr. David M. Gans, Arco Co. (Division of American Marietta), Cleveland. *Akron District Director,* Dr. Anthony F. Finelli, Goodyear Tire & Rubber Co. *Cleveland District Director,* Merle E. Sibert, section head, Physical Chemistry Research, Horizons, Inc., *Dayton District Director,* Dr. Charles A. Dille, director, Dille Laboratories.

Student Medalists of 1958

STUDENT MEDALIST	COLLEGE	AIC CHAPTER WHICH MADE THE AWARD
Adams, Fidelia JoAnne	Tuskegee Institute	Alabama
Aslin, Susanne E.	Occidental College	Western
Avarback, Harvey S.	Tufts College	New England
Barner, Herbert E.	Newark College of Engineering	New Jersey
Barnewell, James	Baldwin Wallace College	Ohio
Baronowsky, Paul E.	Purdue University	Chicago
Barrentine, Melba	Alabama College	Alabama
Bastone, Anthony D.	New York University	New York
Bell, Jerry A.	Harvard University	New England
Ben-Hur, David	University of Southern California	Western
Bernitt, Daniel L.	University of Cincinnati	Ohio
Blair, Rebecca L.	Florence State College	Alabama
Bodnar, Dolores A.	Mary Manse College	Ohio
Body, Ralph W.	Ursinus College	Pennsylvania
Bolster, Robert N.	University of Virginia	Washington, D.C.
Booth, Patricia	Alabama Polytechnic Institute	Alabama
Brannen, William T. Jr.	De Paul University	Chicago
Brauner, Joseph W.	Villanova University	Pennsylvania
Brenner, Marilyn	Simmons College	New England
Brewbaker, James L.	University of Michigan	Chicago
Brown, William A.	Niagara University	Niagara
Buckmaster, Marlin D.	Michigan College of Mining and Technology	Chicago
Burek, Philip J.	Lawrence College	Chicago
Calamari, Timothy	Loyola University	Louisiana
Campbell, Janet F. W.	University of Minnesota	Chicago
Cerny, Lois	Notre Dame College	Ohio
Chang, Ellen Jong-Luen	Radcliffe College	New England
Cioffi, Ralph	Adelphi College	New York
Cochran, Evelyn M.	Monmouth College	Chicago
Daller, John	Loyola University	Western
Davis, John A.	University of Kansas	Chicago
Day, Edgar W., Jr.	University of Notre Dame	Chicago
de Kotre, Aart	New York University	New York
DiCarlo, Ernest N.	St. Joseph's College	Pennsylvania
Dorf, Martha R.	American University	Washington
Dorfler, John	Polytechnic Institute of Brooklyn	New York
Drane, Leslie R. Jr.	Mississippi State College	Louisiana
Flaxel, John T.	University of Oregon	Western
Foght, James L.	University of Akron	Ohio
Foldvary, Elmer	Youngstown University	Ohio
Foris, Anthony	Ohio State University	Ohio
Frankel, Richard A.	Columbia University	New York
Freund, David	Drexel Institute of Technology	Pennsylvania
Fuest, Ronald W.	Seton Hall University	New Jersey
Gallagher, Patricia C.	Chestnut Hill College	Pennsylvania
Geehan, David M.	Wesleyan University	Ohio
Granlund, Rodger W.	Pennsylvania State University	Pennsylvania
Gritzo, Ludwig A.	University of Missouri	Chicago
Gross, Linda	Wellesley College	New England
Harmon, Ronald D.	Otterbein College	Ohio
Harpst, Jerry A.	Wabash College	Chicago
Hartmann, Alfred G.	Massachusetts Institute of Technology	New England

Hays, Byron G.	University of Wichita	Chicago
Heitzman, George	Polytechnic Institute of Brooklyn	New York
Hefley, Jack D.	University of Arkansas	Louisiana
Hutchins, Jane	Brenau College	Alabama
Johnson, Charles S. Jr.	Georgia Institute of Technology	Louisiana
Jones, Marvin T.	Washington University	Chicago
Kallenbach, Neville R.	Rutgers University	New Jersey
Kauffman, Joel M.	Philadelphia College of Pharmacy and Science	Pennsylvania
Kehoe, James V.	City College, School of Technology	New York
King, Marcia J.	Western Reserve University	Ohio
Kinstle, Thomas H.	Bowling Green State University	Ohio
Kornblith, Paul L.	Temple University	Pennsylvania
Krech, Donald W.	Northeastern University	New England
LaBar, Frank E.	Lehigh University	Pennsylvania
Lamb, James D.	University of Maryland	Washington
Lavelle, Joseph A.	University of Scranton	Pennsylvania
Layton, Gary R.	University of Dayton	Ohio
Le Moine, Sharon P.	Kent University	Ohio
Levenberg, Milton I.	Illinois Institute of Technology	Chicago
Levy, Leon B.	New York University	New York
Lindemuth, Robert	Capital University	Ohio
Logan, Omega C.	Howard University	Washington
Losekamp, Bernard F.	Xavier University	Ohio
Lydy, David L.	Indiana University	Chicago
Malarkey, Edward C.	La Salle College	Pennsylvania
McCarthy, William	Catholic University of America	Washington
McQuigg, Robert D.	Muskingum College	Ohio
Mercer, Douglass H.	Hiram College	Ohio
Meyer, Virginia E.	Louisiana State University	Louisiana
Mikolaj, Paul G.	Fenn College	Ohio
Miller, Gerald R.	University of Wisconsin	Chicago
Miller, Steven R.	Case Institute of Technology	Ohio
Milliron, William, Jr.	Denison University	Ohio
Mitchell, Roy E.	A. & M. College of Texas	Louisiana
Mokler, Brian V.	Pomona College	Western
Momany, Frank A.	Oregon State College	Western
Monson, Patricia	Knox College	Chicago
Moses, Francis G.	University of Delaware	Pennsylvania
Moulton, David McLeod	Princeton University	New Jersey
Munro, Joanne	Lake Erie College	Ohio
Nees, Monica	Roosevelt University	Chicago
Nichols, Larry D.	DePauw University	Chicago
Nordquist, Paul E. R., Jr.	George Washington University	Washington
Nowak, Bernard	Canisius College	Niagara
Oberg, Mary C.	Beloit College	Chicago
Opshelor, Virginia B.	University of Pennsylvania	Pennsylvania
Orgell, Carl W.	Lafayette College	Pennsylvania
Partos, Richard D.	University of Chicago	Chicago
Paton, Arthur	Polytechnic Institute of Brooklyn	New York
Paul, Edward G.	University of Utah	Western
Peter, James	Whittier College	Western
Petrakis, Leon A.	Northeastern University	New England
Phillips, David	University of Redlands	Western
Pittman, Richard	Florida State University	Louisiana
Plorde, Donald E.	College of St. Thomas	Chicago
Pontrelli, Gene	City College of New York	New York
Prokop, Robert A.	State University of South Dakota	Chicago
Rascho, John F.	University of Missouri	Chicago

Ridgeway, James S.	University of Louisville	Ohio
Roberts, Eugene	Howard College	Alabama
Robyt, John F.	St. Louis University	Chicago
Ronayne, Michael R.	Boston College	New England
Rucker, Joanna E.	Texas Woman's University	Alabama
Ruopp, Donald C.	Pennsylvania Military College	Pennsylvania
Salinger, Rudolf M.	Cooper Union	New York
Savage, William E., III	University of Toledo	Ohio
Sayit, Cisel	Western College for Women	Ohio
Schormuller, Elizabeth	Ursuline College for Women	Ohio
Schulze, Arthur	Queens Collge	New York
Schunn, Robert A.	Ohio University	Ohio
Schwartz, Suzanne	Our Lady of Cincinnati College	Ohio
Sewell, Mary H.	Immaculate Heart College	Western
Shahan, Sarah A.	College of Mt. Joseph on the Ohio	Ohio
Shuster, Edward R., Jr.	Mt. Union College	Ohio
Silvestri, Anthony J.	Villanova University	Pennsylvania
Singer, Lawrence A.	Northwestern University	Chicago
Smelley, Sarah J.	University of Alabama	Alabama
Smith, Kenneth A.	Massachusetts Institute of Technology	New England
Smith, Robert B.	Wheaton College	Chicago
Sovars, Ojars J.	Brooklyn College	New York
Spangler, Larry L.	University of Pennsylvania	Pennsylvania
Steger, Edward H.	Tulane University	Louisiana
Steinhart, Melvin	University of Buffalo	Niagara
Sternlicht, Himan	Columbia University	New York
Stolki, Thomas J.	Bradley University	Chicago
Strom, Edwin T.	State University of Iowa	Chicago
Tinkler, Jack D.	University of Illinois	Chicago
Tucker, Ernest O.	University of Mississippi	Louisiana
Valbert, Jon R.	California Institute of Technology	Western
Viste, Arlen E.	St. Olaf College	Chicago
Walker, Charles	John Carroll University	Ohio
Wall, Theodore T.	Fordham University	New York
Wellman, Keith M.	South Dakota School of Mines and Technology	Chicago
Wilhelm, Donald J.	Ohio State University	Ohio
Wilkins, Bruce D.	State College of Washington	Western
Williams, James M.	St. Bonaventure University	Niagara
Wisdom, Norvell E., Jr.	University of Texas	Louisiana
Wolsey, Wayne C.	Michigan State University	Chicago
Woody, Robert W.	Iowa State College	Chicago
Wysocki, Allen	Loyola University	Chicago
Yates, Robert L.	University of Florida	Louisiana
Zahnley, James C.	Kansas State College	Chicago

PHOENIX

CHEMICAL LABORATORY, INC.

Specialists in Petroleum Products

Chemical Tests • Physical Tests

Qualification Tests

3953 Shakespeare Avenue
CHICAGO 47, ILL.

MOLNAR LABORATORIES

Organic Process Development, Control Laboratory and Pilot Plant Studies

Toxicology • Bacteriology • Biochemistry

Your Inquiries Invited

211 E. 19th Street, New York 3, N. Y.

Telephone: GRamercy 5-1030

The Function of a Scientist in the Chemical Profession

Dr. C. G. Overberger, F.A.I.C.

Head, Department of Chemistry, Polytechnic Institute of Brooklyn, Brooklyn 1, *N. Y.*

(Presented at the "Young Chemists Meeting" held by the New York AIC Chapter.)

THE AMERICAN INSTITUTE OF CHEMISTS is particularly active in the field of professional relations and has done an enormous service to its membership in this regard. Let us define what we mean by the chemical profession and then outline the functions of the scientist in the various groups. There are three large areas of people in the chemical profession: Those in academic life and research institutes; those in industrial research, and those employed by the government.

First we may define the make-up of the academic family. Of primary importance is the teacher of chemistry. We have a category of those who practice only formal teaching. These play a valiant role, particularly in secondary education. We have a category of people who teach and direct graduate students and who publish their creative work. These latter, who are combinations of teachers and researchers, are in one sense mostly teachers, since their prime purpose is to teach people how to carry out research; they are usually leaders in their fields of interest. In a few academic situations research professors also have a role, but do not belong in a strict academic category in usual circumstances. A third category of the academic family covers scientific administrators, ranging from department heads to deans of the scientific colleges. A fourth category is a small group interested in chemical literature. Scientific librarians perform a vital function in the dissemination of information. Many scientific librarians are employed by industrial research laboratories also. Scientific abstractors are also part of our profession. The budget for the *Chemical Abstract* organization of the American Chemical Society is now over $1,000,000 a year.

Bridging the gap between academic and industrial categories are chemists in research institutes, ranging from groups who work on basic and fundamental problems, resembling academic institutions in part, to those that work on more applied problems which are supported entirely by industrial concerns interested in specific goals. Of the former type, the Rockefeller Institute for Medical Research is the most- noted; of the latter type, Battelle Institute in Columbus, Ohio, is a typical example.

The next area of the chemical pro-

fession, the largest, are those scientists interested in the chemical industry. These include research chemists doing exploratory work in the large industrial laboratories. Included are chemists and engineers interested in research and development; chemists who are interested in all phases of technical sales, ranging from the scientific salesman to the less scientifically educated marketing people; the control chemist and the analytical chemist, who contribute in a non-publicized area of the profession.

A most important category of industrial chemists concerns the management groups of research, research and development, and sales. Fifty years ago, or even twenty-five, the top managements of many chemical companies were not chemists—now the picture has changed. Most chemical companies, and even companies which cannot be classified formally as chemical companies, have top direction from scientific administration. This is, indeed, a recognition of the need of the technically-trained chemist in responsible management during a crucial period of our civilization, as scientific developments force many moral problems on our shoulders. The influence of science on our political control must be judicious and come from men of sound moral as well as scientific judgment. Not to be forgotten in the area of industrial chemists is the consulting chemist who utilizes his special knowledge and laboratory to solve specific problems.

The third large group is of chemists employed by the Government. The tremendous increase in research carried out by the Department of Defense, the Department of Health, Education and Welfare, the Atomic Energy Commission, and many other government agencies, has provided an increasing need for scientific workers. Again, research workers and scientific administrative talent are needed. Unfortunately the salaries of Civil Service employees cannot meet the challenge of the chemical industry. Present laws have been proposed in Congress to improve the salary situation, but not much hope has been expressed because of the economy drive in Congress. It is a pity that salary raises of this type, which would provide the Government with better scientific research workers, must take a low priority on the fiscal calendar. Those government laboratories that allow what may be called academic benefits, traveling expenses to meetings, publications, are those that have the best scientific reputations. Typical examples are the laboratories of the National Institute of Health and the Bureau of Standards.

Let us talk about the function of these various categories of chemists. When you use the title of chemist, you automatically entail certain obligations. The first and basic function of a chemist-scientist is to continue to learn. The chief function of an

academic chemist is to train and prepare students for the profession; here the facts and concepts of chemistry are taught. His role is one of preparation, and he must be progressive. There is little excuse for a teacher who refuses to continue to learn throughout his productive years. A teacher who does not attempt to learn new theories and facts will not be able to teach effectively. A teacher who is also carrying on research in various areas of chemistry will be even more effective in imparting information and in stimulating students. The teacher has a moral obligation to be a frontrunner in his profession. Academic administrators have an obligation to promote good teaching and to encourage scholarly research.

It is also imperative that an industrial chemist in basic research keep at the forefront of knowledge. There is too often a tendency for a chemist in research or technical sales to learn a very small area of chemistry rather well and make no attempt to keep up on related fields. This can only result eventually in severe limitation on the progress of such a chemist. Such general stagnation of industrial chemists can only be combatted by an effort to continue to learn. Going to night school, taking part in activities of a professional scientific nature in your community, continued reading of technical and semi-technical literature, may be part of this effort. Stimulation is absolutely imperative whether you are a control chemist, an engineer in research and development, or a research chemist in the exploratory area.

The sooner that one ceases to make such an effort to advance his knowledge and to keep abreast of new developments, the quicker will he reach a level in his professional life. After some years, this level is really a decline from which he will realize less satisfaction for the future. Without continued interest and exposure to stimulation by others, you will die on the vine intellectually. This is one good reason why in the past some chemists have encountered difficulties in obtaining desirable professional recognition, part of which is their salary. An employer can correctly ascertain when an employee (whether a technically trained man with a 2-year or 4-year college course, or one with an advanced degree) has gone to seed intellectually. He will also know when the man has made an effort to improve his scientific position over a period of years.

There is another general function of a chemist in our world—that of education of the general public in a diplomatic manner about chemistry. The picture that the public often associates with a chemist is of a wild-eyed, fuzzy-haired eccentric, or a druggist. You have a social obligation to convince people that you are a normal person and part of a professional field. If you do not participate in the

social and civic activities of your community (for example, service in the public schools), your ideas and opinions—application of the scientific method to social problems, will not be known. You should mingle, talk, and tell people what your work is about. If we do not educate the public about the ascending disaster curve and the impending clash between scientific and political problems, no one else will.

There is a corollary feature in the obligation of a chemist to improve his professional status. A complete lack of interest in professional activity, irrespective of knowledge or scientific ability, produces stagnation. It is impossible to separate the two points completely because many times those chemists who are not interested in their own scientific betterment are also not interested in professional activities. Talking with and associating with fellow chemists produce in themselves an *esprit de corps*, a feeling of attachment, a desire to work toward the common good of the profession. If one has never served on a committee of any scientific society, it is almost a corollary that he himself is not particularly interested in his own future.

There are so many worthwhile activities which can stimulate the growing chemist intellectually and professionally. A professional group helps a man to grow; a professional group strengthens the man in the eyes of outsiders and allows him more opportunity for improvement of his own working situation. There is no one who has been a member of a scientific or chemical society for any period of time, who does not recognize the value of professional groups in the continued improvement of working conditions and compensation for the professional chemist.

Any scientist must have moral scientific ethics. If he is a researcher, he must prove his facts and report material which has been carefully checked. There is no substitute for critical research. Every chemist in the sales or business end of chemistry also has certain moral ethics. He must not agree to false advertising, he must be sure the monetary motivation of his company does not over-ride his scientific judgment on a new product. There is probably no one area of ethics which is stretched more than the advertising end of business. In the long run, however, those companies and those chemists who are salesmen or executives profit more by honest advertising than do those companies which permit exaggerated claims for new products. The company who sells basic manufactured goods to another company as chemical intermediates must produce good materials; it cannot afford a bad product. The company which sells to the public is usually the worst offender. Unfortunately, the public can be fooled at times. Fortunately, there are also laws to

protect the public from false advertising.

You, as a chemist, either fit or will fit into one of the many categories outlined above. You have certain obligations and functions as a scientist. First, you should continue to learn. Second, you should maintain scientific ethics. Third, there is a need for you to teach the general public the scientific method. Do not be a prophet, but be a teacher. Finally, you should participate in chemical professional activities. However, the first is the most important function. You must continue to strive for increased knowledge and understanding in your own profession. All other benefits will derive from this desire to improve your capabilities. When you use the title "chemist," you have the obligation to be a good one.

From Test Tube to Tank Car

Dr. Sydney Steele

Director, Public Relations Department, Atlas Powder Company, Wilmington 99, Del.

(Presented at the Student Medal Award Meeting of the Pennsylvania AIC Chapter, in Philadelphia, Pa.)

IN the chemical industry, it takes an average of five to ten years for an idea to progress from the test tube stage to the point where, if you are lucky, you are selling it in tank-car lots. Here are some of the problems involved in getting a product from the laboratory to the market place:

First, the research director has to be convinced that he has a workable and economical process, using low-cost raw materials; ending with a product which has properties that people will either want to buy instead of what they are already buying, or will find new uses for it.

If he succeeds in convincing management that here is a good process and product, then usually the market research, chemical engineering, economic evaluation, and product development departments are flagged.

Market research is asked to find out how much of this product is likely to be sold in the first five years, and in the first ten years; with what other products must it compete, at what price must it sell to obtain a share of the market? Chemical engineering must answer the question, how much will the full-scale plant cost to build, and what will be the operating cost? Economic evaluation is asked, if the product can be sold at the assumed price, will the profit be large enough to yield a satisfactory return on the total investment, which includes the buildings and equipment, and the

working capital necessary to operate?

Product development is asked to review the market research data and to give an opinion on the probable development costs. If the market research report is favorable; if the product development people feel that the product's properties are sufficiently useful to earn it a share of the market; and if it can be developed, engineered, manufactured, and sold at a price that will yield a satisfactory return on the total investment in manufacture, management is then likely to turn the product over to product development for further work.

Again, if the development work proceeds satisfactorily, and potential customers are found, the central engineering department will be asked to design a full-scale plant, and an estimate of its cost is prepared.

Frequently, when the estimate is shown to management, the immediate reaction is, "This costs too much." The project then goes back to the engineering department to be pared down. The engineers, being good corporate citizens, do as requested, and the project is resubmitted for, say, 85% of the original estimate, and then may be approved.

Concurrently, the site selection people have been busy, and so have the lawyers. Product development and market research have continued their studies. Research has probably improved the basic process, and chemical engineering the prototype equipment in which the product is now being manufactured in test-marketing quantities.

The next step is the preparation of final drawings, and at this point, the production men, who will later have to operate the full-scale plant, begin to point out some rather important flaws in the design. They may say, "Where is the safety exit from this platform 50 feet in the air?" "Why is the loading platform so small?" "How do you maintain such-and-such a piece of equipment without tearing down half the plant?" They are likely to add that there aren't enough lockers, and that more access roads are required.

At this point, the engineers often pull out their original drawings, and show that many, if not all of these items were in the original plans. Since they had been requested to reduce the cost, these were the items which had been pared. The production people then say, "Well, we won't be able to operate the plant efficiently unless these items are restored," and so a Part II Appropriation Request is prepared. This often brings the total cost of the project close to the original estimate, and sometimes, because of rising prices, the total appropriation may exceed the original estimate.

After a construction period of several months to a year or so, the plant begins to operate. If the company is lucky, the plant operates at costs fairly close to those estimated, its product

can be sold at the assumed price, and the volume is large enough so that the plant can operate to produce a satisfactory return on the total investment.

Along the road from the test tube to the tank car, all basic corporate functions are involved: research and engineering, marketing, financial, legal and corporate, production, and human relations.

There are some multi-purpose tools which can be indispensable. Perhaps the most important of these could be labeled "common sense." Technically-trained people are likely to look for explanations, or to develop theories, based on their fund of technical knowledge. This does have its pitfalls, as can be illustrated in two stories.

The first story concerns a physician, a scientist, and a psychiatrist who went hunting in winter. They were caught in a heavy, wet snowfall, and took refuge in an old trapper's cabin, well stocked with food, fuel and a pot-bellied stove. They soon had a fire going and were comfortable.

But there was one odd thing. The stove, instead of sitting on its four legs on the floor, was suspended by straps from the ceiling, so that it was about at chest level. They began to speculate why.

The physician said the reason, to him, was clear: The trapper suffered from arthritis and found it difficult to bend over to put in fuel. The scientist disagreed: he said he was sure it had something to do with the chimney draft, and with radiation from the stove. The psychiatrist took a different view; the trapper obviously had some rare neurosis that made him prefer to keep everything at chest level.

A little while later, the trapper came in. They told him of their curiosity about the position of the stove, and asked him which theory was right. "Well, gentlemen," the trapper said, "you are all wrong. As it happens, the answer is quite simple: I ran out of stove pipe."

Now the true story: Some years ago, I was production superintendent in a plant where one of the operations consisted of reacting Witherite (crude barium carbonate) with hydrochloric acid, to make barium chloride. A certain amount of Witherite was shoveled into a tank. The acid was poured in and the whole thing agitated until the reaction was almost complete. There was always a little unreacted material at the bottom of the tank, so that each succeeding batch took a little longer to complete. After a certain number of batches, the tank was pretty-well filled with partially-reacted Witherite. At this point, no new material was added, the whole thing was given a thorough working over, and the residue finally thrown away. We called this the clean-up run.

Having a mathematical background, I decided that the smart thing to do was to calculate the optimum number of batches to run before the

final clean-up. This seemed an ideal application for calculus, and so I started with anticipation of immediate success. On the first go-around, I ended up with an equation which had three roots, one of which turned out to be negative. The other two were imaginary. This was quite a shock. Never doubting that the power of mathematics was invincible, I tackled the problem again. This time, I came up with an equation that had four roots. Two of them were negative and two were imaginary.

At this point there seemed to be only two possibilities: one, that the mathematics had been incorrectly applied, or two, that the mathematics had given the right answer, which was that there was no such thing as an optimum number of batches to run before the clean-up.

Common sense then came in a little late. I looked at the record of a typical sequence of batches. It showed that the first batch would take 20 minutes, the second 30, the third 40, etc., and finally the clean-up lasted about two hours. This was equivalent to an average of 66 minutes each for ten batches. The answer was then clear. There was no such thing as an optimum number of batches to run, as the mathematical analysis had twice foretold. What one did was to take out the small amount of residue after each batch, until sufficient residue had accumulated to make the final clean-up run. This way, instead of having a sequence of 20, 30, 40 minutes, and so on up to 100, one had nine 20-minute batches and one 120-minute batch. Average time per batch: 30 minutes instead of 66. Time saved: about 55%.

If there is a moral to these two stories, it is that one should always look around first for the common-sense solution to a problem. If this solution is not evident, then, and only then, take the more scientific or complicated approach. Always use common sense in checking results. After going through a long series of calculations to reach an answer, stop and see if there isn't some simple way to check the order of magnitude of the answer. Decimal points have a habit of ending up in the wrong places. Common-sense extrapolations from an answer or its implications frequently will reveal flaws.

Perhaps the second multi-purpose tool could be labeled "the open mind." Most of us, when young, like to be alone with our convictions. When we meet someone with even slightly different convictions, we sometimes do not even listen. Some have already realized the importance of an open mind; that is the method by which one can acquire knowledge. Some listen to ideas from others and may take advice. But not all the advice offered will be worth taking, and not all of the ideas will be good. The point is to learn as soon as possible to weigh as impartially as you may, all advice and

all ideas, and draw your own conclusions. You will find, if you look over the things which were believed only a few years ago, how naive some of those beliefs were. In a climate of growing knowledge, a remark attributed to Oliver J. Cromwell is pertinent. He said, "I beseech you, in the bowels of Christ, think it possible you may be mistaken."

This business of taking advice and consulting with others is most important. And there is an elegant, ecclesiastical solution to this general problem. The abbot of a Benedictine Monastery must consult with elder monks before rendering decisions, even on minor matters. On matters of importance, he must consult with everyone, even the youngest. The subordinates are not merely free to express their opinions, these opinions must be sought and solicited. The rule in no way abridges the line authority of the abbot in making the decision. He is simply prohibited from making the decision until the rule is complied with. This is an excellent example of the open mind policy at work. It is also the key to the vexing question of the relationship between line and staff. It might also be regarded as the forerunner of operations research.

The third multi-purpose tool can be labeled "human relations." These are at the very core of manpower development, without which we can never have enough people to carry our products through successfully and quickly from the laboratory to tank car.

A few people get ahead by ignoring human relations, and by paying attention exclusively to their own interest; some may manage to be reasonably happy doing it. However, business and individuals can realize their highest potentials only in a climate of good human relations.

Paraphrasing a remarkable speech made in 1951 by Frank Curtis, we are dealing here with a matter of more spiritual content than material. It is well known that any organization derives its spiritual flavor from those at the top. Since programs flourish best in a climate of good human relations, it is essential that they should have complete support from the highest level in the organization, else they will wither at the roots, and the best efforts of those trying to carry them out will be of little avail.

The three multi-purpose tools, common sense, the open mind, and human relations, may help you as you progress, metaphorically and perhaps actually, from the test tube to the tank car during your careers. Is there still an overriding philosophy, an anchor to windward, a purpose to life? I think so. And I read it recently in the form of a parable.

There was a man who had many friends. These he had divided mentally into three groups. The first included only his closest friends. He liked to play poker with them, go to

ballgames, take in a show, go fishing. They all had a wonderful time. The second group included the people that, when he ran into them, he was glad to meet them, but they were never really intimate. Sometimes they had differences of opinion, but by and large, he liked them. There was a third group, but strangely enough, only one man was in it. Of this man, he was never quite sure what kind of friend he was. They did not see much of each other and their relationship was on a very casual basis.

The time came when this man who had many friends was called to stand trial in court. Since the charge was serious, he went to his good friends in the first group for help. To his surprise, they all turned him down, so he sought help from the second group. Almost all of these said, "Well, we'll come with you to the courthouse, but we'll have to leave you there." In desperation, he called on his last remaining, somewhat doubtful friend—that one in group three. To his surprise this man said, "I'll go to court with you, and I'll speak up for you." And he did. He spoke so eloquently that the man was acquitted without a stain on his character.

The translation of the parable is this: A man has three friends: his money, his relatives, and his good deeds. When he dies, his money can go no distance at all with him. His relatives can go only as far as the grave. But his good deeds will speak for him beyond the grave.

Dr. Paul H. Margulies, F.A.I.C., is with the Central Research Laboratory of Food Machinery & Chemical Corp., at P.O. Box 8, Princeton, N. J. He was formerly with the Becco Div., at Buffalo, N. Y.

John J. Levenson Jr.
& Associates

Chemical and General Management Consultants

Research Organization and Guidance
Process and Product Development
Technical and Economic Analyses
Marketing Studies and Surveys

ROOM 2238, 60 EAST 42nd STREET
NEW YORK 17, N. Y. OXford 7-9544,5

NOW OVER 5100
BIOS CHEMICALS

- TRIETHANOLAMINE TRINITRATE
- TRIETHYL ANTIMONY
- TRIETHYL BORATE
- TRIETHYLCHOLINE
- TRIETHYLENEMELAMINE
- TRIMETHYLADIPIC ACID
- TRIMETHYL ANTIMONY
- TRIMETHYL BORATE
- TRIPHENYL BORATE
- TRIPHENYLBORON
- TRIPHENYLETHYLENE
- TRIPHENYLFORMAZAN
- TRIPHENYLFULGIDE
- TRISILANE
- TRITOLYLAMINE

Ask for our new complete catalogue.

BIOS *Laboratories, Inc.*
17 West 60th St. New York 23, N. Y.
PLaza 7-8171

Prize Paper

Chemistry as a Profession

Robert B. Smith
P.O. Box 101, Vista, California

(This paper was chosen by the Committee on Student Medals as the best essay submitted in the Student Medalist Essay Contest of 1958. The prize was $100.00. The author received a student medal from the Chicago Chapter this Spring when he was a senior at Wheaton College, Wheaton, Ill.)

ONE characteristic of the human mind which is apparently universal in occurrence is curiosity. It has been evident in the human race from its outset and will continue to prevail as long as men walk the earth. Mankind has always experienced a sense of wonder concerning the unknown; an inexplicable urge to gain knowledge of phenomena not encountered directly in the course of everyday events grips one and all.

Curiosity has generally occupied no more of human experience than more or less idle wonder. It has been only recently, in relation to the age of man on the earth, that we find examples of man's curiosity diverted from aimless daydreaming to the solving of concrete problems in such areas as chemistry and the other sciences. It is perhaps surprising that such application did not occur earlier in the course of history, when one reflects on the basic nature of chemistry. The existence of matter is one of the realities of life closest to common experience; it composes all of the multitude of substances which people see, feel, taste, and smell each day. It supplies the forms in which the concept of life becomes meaningful. And it is matter with which chemistry deals.

It was obviously inevitable for some ancient thinker to contemplate a process such as the crumbling of a clod of dirt and to wonder where the disintegration would cease. Motivated by this primitive curiosity, clever minds often speculated upon the fundamental nature of matter. During the Middle Ages certain persons fashioned the first attempts to bring this thinking about matter over from the realm of the theoretical to that of the practical. Unfortunately for them, these men were ahead of their times, attempting to do a job before the tools necessary were yet invented. It has been only after considerable insight into the nature of matter was gained that the dream of these early alchemists has been realized to a certain extent.

During the Dark Ages a heavy emphasis was placed on the mystical and spiritual aspects of the universe. Without implying that there is error in spiritual emphasis, it may be observed that some factor in human nature tolerated the mysticism and un-

due suppression of objective knowledge for a certain length of time, and then it reacted. The result was a new and exciting awareness of man's natural environment. A new system of philosophy commenced to sweep over the world and gradually men began to think in naturalistic terms. A quest for learning resulting from this way of thinking laid the foundation for modern science and thus shaped the future of the modern world. At last men were able to follow their inherent curiosities in a gainful occupation. The initial results and successes of accelerated scientific endeavor served to whet the appetite of mankind for learning to control the universe. Soon these successes began to snowball as science was growing up.

Then the laymen, as well as the scientists, seized upon the early advances, jumping to the unwarranted conclusion that the age of modern science would cure the world's ills. In their deceptively optimistic philosophy, man was envisioned as the savior of the race from self-destruction or natural extermination. Of course, in the quest for the triumph of mind over matter, the sciense of matter, chemistry, played an important role.

It is apparent that the development of chemistry as a modern science is an effect of the prevalence of a philosophy which has been proved false in the passing of time. Fortunately, it has most often been applied wisely in the service of mankind, in raising the general standard of living, and in aiding man to improve his lot, and these features have raised chemistry to the level of being one of the most rewarding occupations of the present day. However, the mistake of blind faith in the innate goodness of a science, which is in reality morally neutral, must be avoided.

Many believe that at present chemistry must be classified as a vocation. The current problem is to raise the reputation of chemists to the level of a profession in the thinking of the man-on-the-street. In this discussion I shall deal only with the industrial chemist for a good reason. The responsibilities of the "university chemist" kept in proper perspective are occupied primarily with teaching rather than with research. Too many universities fail to accept this fact and pressure their chemistry professors into neglecting their educational duties in order to bring publicity to the school. At any rate, the academic aura of the university has already blessed these men with the reputation of the professional man, and it need not be sought from chemical work as such. Therefore, the real problem lies with the status of the industrial chemist.

First of all we might form some picture of what the professional man is supposed to be. Webster's Dictionary does not shed much light on the matter with its broad definition, which serves merely to differentiate

professionals from common laborers. While it is certainly not inaccurate to classify such persons as salaried athletes in this category, the popular conception of the professional man whom we are considering here is much narrower. Traditionally, the three professions most commonly designated as such have been medicine, law, and theology. To these we might now at least add engineering and education.

One denominator common to all these fields is the necessity of extensive formal educational training; they are learned areas of endeavor. Another is the distinct humanitarian flavor present in their application to everyday life. Because the individuals involved are assumed to be persons of intelligence and knowledge, they are normally respected in the community. Finally, as connoted by the use of the term "individuals" above, the participants in these activities have generally exercised their talents alone or in very small groups, often in direct contact with the public. This I feel to be one of the most basic of all these attributes. As I understand the current situation, it is the esteem of society for the man of intelligence and wisdom that the chemists express in the term "professional," and for which they are presently striving.

The historical background of modern chemistry has been treated briefly, so as to illuminate the relationship between the present-day chemical industry and a major modern cultural trend to be examined presently. To review, it was mentioned that the rise of modern chemistry originated in the renewed awareness of the physical environment of man, and can be related to the rise of materialistic thought derived from the early promise offered by science. The impetus which materialistic optimism gave to scientific and mechanical development was responsible in large measure for the great industrial revolution. And this revolution, in turn, had several important social implications.

One of these implications was the centralization of population. The geographical aspect of centralization is simply accounted for. With the advent of machines, men ceased to provide directly for the major portion of their existence and started specializing into narrower vocations, because of the increased complexity of production processes. Being no longer so self-sufficient as before, the people were forced to move together in cooperative effort. The concept of teamwork gradually moved to the fore as industry grew up, and centralization began to branch out into areas of life other than the geographical. The process at present has gone so far that it might be termed the total organizing of society. It has been given an added boost by the existence of the large corporations, until we have now come to the world of the mid-twentieth century—a world in which major enterprises are carried out by

THE LENTO PRESS, INC.

Distinctive Printing

441 Pearl Street New York, N. Y.

WOrth 2-5977

complex machines composed of both people and equipment.

Chemistry grew up in an era when the worth and development of the individual was one of the nation's highest ideals. But modern business centralization has spawned yet another ideology—that based on the concept of the inherent goodness of majority will. Modern America is even beginning to think that, whether or not he is conscious of it, what the individual really wants for himself is whatever will be in the best interest of society as a whole. To believe this is to deny the existence of the basic problem of democracy: Individual freedom versus social order. The implications of this line of reasoning show that following it must lead to mediocrity. In molding the subnormal to the higher pattern of society in general, it will also cut the supernormal stratum of the populace down to a lower level. This robs the culture of the hope of improvement and leads to eventual stagnation.

Before the relevancy of this trend is questioned, let us relate it to the problem of the status of the industrial chemist. So long as one will admit the need for the reputation of the chemist to be raised, the current question is how to accomplish it. Many proposed remedies have been floating around in editorials and letter-to-the-editor columns in recent months, but I feel most of them do not penetrate past matters of public relations. The first step toward solution lies deeper than this. Look again at the traditional professions, where work is carried on by individuals. In the past this has been true of chemists as well, especially in academic circles, and the free hand given to roving curiosity produced great strides in the development of the chemical science. Nowadays, however, the impact of the inherent-goodness-of-society theory is leaving its mark on industrial chemistry. It is no mere accident that, with the exception of a very few corporations who lay great stress on individual achievement, industry can no longer lay claim to the most respected scientists of the nation.

Industrial chemistry is seemingly on its way to becoming a highly educated

NORMAN APPLEZWEIG ASSOCIATES

Specialists in
Applied Biochemistry

Product development consultants to the Food, Drug and Cosmetic Industries

131 Christopher St., New York 14, N. Y.
ORegon 5-1860

form of skilled labor, if the social molding process is allowed to persist. The budding chemists will obtain their education and training in chemical theory and skills, then they will be presented with the work to be accomplished "for the company's best interests." Those who do not "fit in" with the system are shelved where they can do no harm or are turned loose. I would insist that before chemists dream of commanding their "professional" status, they must treat each other and be treated as intelligent, educated individuals. They must be free to let the cream rise to the top—to utilize their full potential in the course of their work. Only when they themselves have a sense of following their own curiosities, rather than carrying out the slave labor resulting from the ideas of another, will they deserve the title they seek.

These ideas may seem somewhat strong in their accusations, but they are meant to serve as a warning, in very broad outline, against a subtle influence which threatens eventually to destroy completely all that is contained in the present concept of "professional." Unless this influence is headed off first, no status the chemists may attain will ever be free of jeopardy.

Lawrence Flett, Hon. AIC, consultant, National Aniline Division, Allied Chemical Corp., New York, N. Y., returned recently from a two months' trip to Europe. On November 12th, he spoke before the Twin City AIC Chapter, at its meeting in St. Paul, Minn., on "Human Factors in Organized Research."

Charles T. Genaux, M.A.I.C., is on leave from the University of Alaska, taking graduate work in biochemistry, toward the Ph.D., at Florida State University, Tallahassee, Fla., under Dr. Sydney Fox, director of the Oceanographic Institute.

Joseph C. Hand, Jr., A.A.I.C., of Redstone Arsenal, Huntsville, Alabama, and assistant secretary of the Alabama AIC Chapter, was married, Nov. 8th, to Miss Emily Faye Young.

Lucius Pitkin, Inc.
ESTABLISHED 1885
Metallurgical Chemists & Consultants
Analysis—Sampling—Assaying
Spectrography—Metallography
Corrosion Studies—Research
X-RAY FLUORESCENT SPECTROGRAPHY
Pitkin Bldg., 47 Fulton St., N. Y. 38, N. Y.
Member:
American Council of Independent Laboratories

R. STECKLER LABORATORIES
19220 Miles Ave. Cleveland 28, Ohio
Montrose 3-6575
Research • Product Development
Consultation • Market Research
Product & Process Evaluation
SYNTHETIC RESINS, POLYMERS, COATINGS
Fully Equipped Laboratory

ROBINETTE RESEARCH LABORATORIES, INC.

Industrial Research • Consultation
Technical and Economic Surveys
Product Development
Chemical Market Research
16 East Lancaster Avenue
Ardmore, Pa. Tel. Midway 2-6457

Herbert F. Schwarz, F.A.I.C., is co-chairman of the South Suburban "United Nations," a mock U.N. general assembly, being held Oct. 19 to Dec. 10, in the south suburbs of Cook County, Ill. Purpose of the assembly is to learn about the U.N. and its procedures. Fifty adult groups are participating, each group taking the part of a member of the U.N. and trying to represent their ideals and viewpoint during the debate of five important world political issues.

Earl P. Stevenson, F.A.I.C., chairman of the board of Arthur D. Little, Inc., and of Nuclear Metals, Inc., took part in the dedication ceremonies when Nuclear Metals, Inc., formally opened its new two-million dollar metallurgical research and development laboratory, at Concord, Mass., October 24th.

Dr. Ralph L. Evans, F.A.I.C., president of Evans Research & Development Corp., New York 17, N. Y., recently presented service pins to longtime employees of the consulting laboratory. **Dr. Murray Berdick,** F.A.I.C., coordinator of research, received a pin representing ten years of service.

Dr. Frederick W. Stavely, F.A.I.C., president of the Industrial Research Institute, Inc., New York 17, N. Y., announces that Dr. Frank K. Schoenfeld, vice president—research of The B. F. Goodrich Co., Akron, Ohio, has been awarded the Industrial Research Institute Medal for 1959. Presentation will take place next May.

Andrew D. Batcho, A.A.I.C., has finished his graduate studies with Dr. Rapoport at the University of California, Berkeley, and joins December first, the staff of American Cyanamid Co., Bound Brook, N. J., as research chemist.

B. F. Goodrich Chemical Company announced the opening, September 17, of a new plant at Calvert City, Kentucky, for full-scale production of its water-soluble polymer, Carbopol. Properties and applications of this transparent gel were demonstrated in a variety of products—polishes, coatings, cosmetics, pharmaceuticals, and industrial specialties.

Pennsylvania Chapter

Chairman, Dr. James L. Jezl
Vice-chairman, Dr. William E. Langeland
Secretary, Dr. Ezra Bitcover,
Eastern Utilization Research Labs.,
600 East Mermaid Lane, Wyndmoor, Pa.
Treasurer, John H. Staub
National Council Representative,
Marcus Sittenfield

The Pennsylvania Chapter has appointed the following Committees for the current fiscal year:

Arrangements, Dr. William E. Langeland
Internal Publicity, Dr. Ezra H. Bitcover
External Publicity, Dr. Sidney Cantor
Legislative and Ethics,
Dr. Victor V. Bellino
Honor Scroll Award, Marcus Sittenfield
Membership, Dr. James L. Jezl
Technical Service Council Representative,
Dr. Ray Dalter

New York Chapter

Chairman, George Foy
Chairman-elect, Dr. E. J. Durham
Secretary, Dr. Kurt S. Konigsbacher,
Evans Research & Development Corp.,
250 E. 43rd St., New York 17, N. Y.
Treasurer, Shepherd Stigman
National Council Representative,
Dr. Ernest I. Becker

The New York Chapter announces that the following committees are serving for this fiscal year. Other Committees will be announced later.

Aims of Institute: Dr. Maurice J. Kelley
Arrangements: Robert R. Dean
Auditing: Richard L. Moore and
Dr. Murray Berdick
Budget: Richard L. Moore
Education: Karl M. Herstein
Greetings: Fortuno DeAngelis and
Ann L. Farren

Twin City Chapter

Chairman, Morris Kenigsberg
Vice-chairman, Dr. J. F. Abere
Secretary, Rosemary Klinkenberg,
Twin City Testing & Engineering Lab.,
2440 Franklin Ave., St. Paul, Minn.

FOSTER D. SNELL INC
RESEARCH AND DEVELOPMENT CONSULTANTS

Completely staffed with over 100 specialists, equipped with 10 stories of laboratories, backed by 36 years of experience in many fields:

Product Development - Analyses
Engineering - Market Research
Physical Measurement - Toxicology
Bacteriology - Animal Work
Food Technology

Bulletins and detailed information on request without obligation. Call WAtkins 4-8800 or write to:

FOSTER D. SNELL, INC.
29 W. 15 St., N.Y. 11, N.Y.

Treasurer, Henry L. Weisbecker
National Council Representative,
Dr. John L. Wilson
Alternate Council Representative,
Albert C. Holler

The following committee appointments have been made by the Twin City Chapter:

Publicity chairman, A. C. Holler
Membership Co-chairmen,
A. Gearman, Joseph Cosimini
Professional Activities, Dr. John L.
Wilson, J. Cosimini, W. W. Benton
Editor of Fumes,
Miss Rosemary Klinkenberg

TOXICITY TESTING
of FOOD, DRUG and COSMETIC INGREDIENTS

ROSNER-HIXSON LABORATORIES
7737 South Chicago Ave.
Chicago 19, Ill.

Chemical Books Abroad

By Dr. Rudolph Seiden, F.A.I.C.

Verlag Technik, Berlin C 2: *Handbuch des Chemikers,* Vol. I, by B. B. Nikolski; 1956, 823 pp.; DM 37.80—Another fine handbook for chemists, again translated from the Russian. Written for students and industrial chemists as a 3-volume reference work, the first part includes numerical and other tables, line diagrams, and clear, concise text dealing with up-to-date facts concerning chemistry and technic in general, elements, properties of inorganic substances, and spectral lines. The book is well printed.

Editio Cantor, Aulendorf i. Wuertt.: *Organisation der Konfektionierung von Arzneimitteln,* by P. Berndt; 1955, 86 pp. —A multitude of valuable suggestions for the management of pharmaceutical plants. This booklet, with minor adjustments to conform to American conditions, could probably find many readers in this country.

Ferdinand Enke Verlag, Stuttgart W: *Chemie und Technik der Vitamine, Vol. II/2,* No. 2 (pp. 161-320), by H. Vogel; 3rd ed.; DM 28.80—This issue presents the chapters on niacinamide (with 1600 references) and pyridoxin.

Karl Haug Verlag, Ulm-Donau: *Vagus und Sympathicus in Diagnostik und Therapie,* by S. Rilling; 1957, 180 pp. (149 ill.) DM 39.60—Diagnosis and treatment of vagal and sympathetic nerve conditions.

Birkhaeuser Verlag, Basel: *Konstitution und Vorkommen der organischen Pflanzenstoffe,* by W. Karrer; 1958, 1207 pp.; sFr. 136.—A well-organized presentation of all (2669) known organic substances found in plants, including micro-organisms, but excluding the alkaloids; stressed are the isolation of the pure compounds and the explanation of the constitutional formula and synthesis of each. Plant substances whose constitutions are not yet known have not been considered in this fundamental work. Literature references include the year 1956.

Friedr. Vieweg & Sohn, Braunschweig: *Tabellenbuch Chemie,* by R. Kaltofen *et al.;* 1958, 448 pp.; DM 17.60.—One of the fine table books for chemists and chemical engineers—a compilation of constants and other important data of the chemical elements and of thousands of compounds; in 51 chapters, with numerous explanatory notes and an extensive index. The print, paper, and binding are superior.

Springer-Verlag Berlin W 35: *Praeparative organisch Photochemie,* by A. Schoenberg. 1958. 286 pp.; DM 58.—A monograph dealing with a rarely treated subject matter. It is a comprehensive, well-balanced discussion of the reactions and techniques which are of importance to the preparative organic photochemist.

Akademie-Verlag, Berlin W 8: *Spurenelemente in der Landwirtschaft,* by A. P. Winogradow, translated from the Russian by M. Trenel; 1958, 631 pp.; DM 48.—This is the report of the first Union Conference of the Academy of Sciences and the Lenin Academy of Agricultural Sciences which took place in Riga in 1950. The symposium was concerned with the use of trace elements in agriculture. There were 51 lectures. Of special interest to readers are those showing the success which the application of B, I, Mg, Mn, Zn, Cu, Co, Cd, and Mo has on soil and/or feed improvement and thus also on the health of the domestic animal and man.

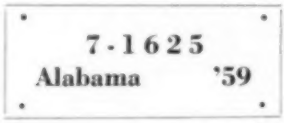
ANNOUNCING!
Laboratory Apparatus
IN 'APPROVED' AND 'CERTIFIED' GRADES
THERMOMETERS · BURETTES
VISCOMETERS · PIPETTES
HYDROMETERS
Immediate Delivery from
Large Comprehensive Stock
EVERY ITEM INDIVIDUALLY TESTED
For further information write
UNITED STATES TESTING COMPANY, INC.
2040 Park Avenue, Hoboken, New Jersey
BOSTON · BROWNSVILLE · DALLAS · DENVER · LOS ANGELES
MEMPHIS · NEW YORK · PHILADELPHIA · PROVIDENCE
SAN ANGELO · TULSA

Communications

Numerology?

To the Secretary:

Recently I got my 1959 auto license plate:



I was impressed by the significance of these numbers to the AIC; The 7 represents the 7 months from the October Council Meeting to the next AIC Annual Meeting. The new Chapters, Delaware, Midwest, and Piedmont, bring the AIC total number of Chapters to *16* at present. The *25* represents the number of Chapters that our Committee on Chapter Activities hopes to have by the next Annual Meeting. The 7 and *Alabama* also stand for the 700% increase in membership which this Chapter has attained since June, 1957!

—Martin B. Williams, F.A.I.C.
Chairman, Committee on Chapter Activities.

Worthwhile Article

To the Editor:

True Boardman's article, "Motion Pictures as a Tool for Teaching Chemistry" (THE CHEMIST, October), was informative and interesting. . . . It was a worth-while article and True Boardman should be commended for it.

—Dr. Stephen E. Ulrich, F.A.I.C.
Chairman, Dept. of Science, Evening Division, Rutgers University.

The Value of Personal Contact

To the Editor:

To increase membership is no work at all! Just a few letters, a few conversations with the right people at the right time. If all members would remember that it's easy to get new members from the circle of their co-workers, friends, customers, we could triple the membership in a year!

—Dr. Rudolph Seiden, F.A.I.C.
Kansas City, Mo.

Dissolvable Paper

To the Editor:

Member Krashin's announcement in THE CHEMIST (p. 480, Nov. 1958) of a new bulletin which can be dissolved in cold water suggests interesting applications. Could this principle be applied to dissolving old newspapers, unsolicited mail, summonses, letters of reprimand, citations, and sundry waste paper?

—Erwin C. Hoeman, F.A.I.C.
Yuma, Arizona

Application of Thermoanalytical Research Techniques — Thermogravimetry, Differential Thermal Analysis, Thermo-Volumetry — Development of Laboratory and Control Instrumentation

GORDON and CAMPBELL
Consulting Chemists
Foods, Pharmaceuticals, Minerals, Cosmetics, Metals, Ceramics, Polymers
Saul Gordon, Ph.D. **12 Brookfield Way**
Clement Campbell **Morristown, N. J.**
JEfferson 8-7969

Dedication Meeting of the Midwest Chapter

THE new Midwest Chapter of THE AMERICAN INSTITUTE OF CHEMISTS held its dedication meeting at Rockhurst College, Kansas City, Mo., on November 13.

The meeting opened with an invocation by the Very Rev. Maurice E. Van Ackeren, S. J., president of Rockhurst College. Introductions were made by Dr. Vanston H. Ryan, director, Division of Natural Sciences and Mathematics of the college.

Dr. A. Ernest MacGee, of Skelly Oil Company, Kansas City, spoke on "Why a Midwest AIC Chapter?" Martin B. Williams, chairman of the AIC national Committee on Chapter Activities, discussed programs for local Chapter activities.

Dr. Emil Ott, AIC president, made the dedication address, welcomed this new Chapter to the AIC, and presented it with its Charter.

The report of the Nominating Committee for the election of officers was presented by Henry E. Hancock of Davis Paint Company, North Kansas City.

The following officers were elected:

Chairman, Dr. Rudolph Seiden

Chairman-elect,
Dr. Vanston H. Ryan

Treasurer, Dr. Frank A. DeMelfy

Secretary, Daniel J. Sullivan

National Council Representative,
Dr. A. Ernest MacGee

The Benediction was given by Father James D. Wheeler, S.J., of Rockhurst College.

Opportunities

Doris Eager, M.A.I.C.

Positions Available

Assistant Air Pollution Control District Officer. Degree in chemistry, 4-years air pollution control engineering experience, or experience related to air pollution, as design or engineering construction of air conveying or handling equipment, combustion or industrial furnaces; chemical plant unit operations or processes; industrial hygiene; or related fields. Salary to start $8,988. Apply Dept of Civil Service and Personnel, 236 Third St., San Bernardino, California.

Organic Chemist. Independent research in development of sensitive methods for descriptive analysis; application to analytical problems. M.S. in chemistry; with laboratory research in methods of chemical analysis or organic chemical reactions. Talent for chemical microscopy, microchemical analysis. New England. Box 121, THE CHEMIST.

Junior Chemical Engineer. New England. Degree in Chem. Eng. or Chem., or M.S. in Physical Chem. Up to five years experience in product development. Box 123, THE CHEMIST.

New Piedmont Chapter Holds Charter Meeting

(Contributed)

DR. Charles T. Lester, dean of Graduate School, Emory University, presided over the Charter Day Banquet of the new Piedmont AIC Chapter at the Atlanta Athletic Club on Nov. 22, 1958. Approximately fifty members and guests were in attendance, including AIC President Emil Ott, AIC Past President John H. Nair, and the secretary of the Alabama Chapter, Martin B. Williams. The dinner was preceded by a reception and social hour, courtesy of the Will Corporation of Georgia, Beckmann Instruments, Inc., and J. T. Baker Company.

The Piedmont Chapter is one of three chartered at the October meeting of the national AIC Council. It is currently made up of AIC Fellows, Members, and Associates, resident in North Carolina, South Carolina, and Georgia. The formation of the Chapter is largely the fruition of efforts by former AIC President Nair and Martin Williams, chairman of the National Committee on Chapter Activities. The spark-plug locally has been A. J. Shingler of the Coca-Cola Company, who is serving as secretary-treasurer of the new chapter. Dean Lester is chairman, and Dan L. Henry of Law & Co. is chairman-elect, while Dr. O. E. May of The Coca-Cola Company is National Council representative.

After presenting the new charter to Dean Lester, Dr. Ott spoke on "What Makes the Chemist and Chemical Engineer a Professional." He pointed out that there is no question but that chemistry and its practice makes the chemist as professional as the physician, lawyer, or minister. However, the latter are termed "learned professions." Though these groups practice, they are not creative. They use past accomplishments as guide posts to decisions. On the other hand, the chemist is constantly discarding the past and pushing outward into new discoveries. We need to promote effective, sustained publicity, not to headline the miracles of chemistry, but to educate the public through daily columns about the basic need in everyday life for the creative effort of the chemist, whose work is more important than that of the lawyer or even the doctor, who create nothing, but use knowledge unearthed by scientists, particularly chemists.

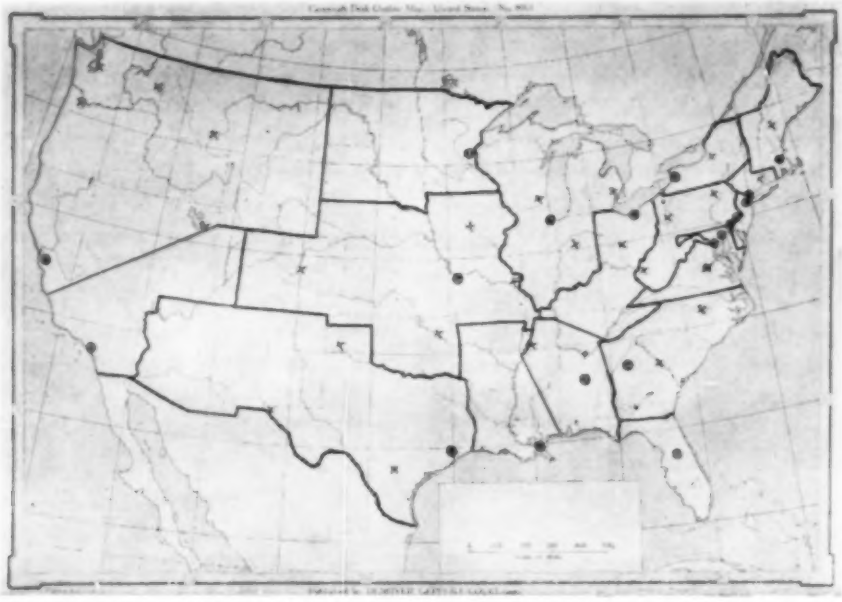
Dr. Ott indicated that he expected great accomplishments at the local level from the new chapter.

The National Science Foundation has now moved to its new quarters at 1951 Constitution Ave., Washington 25, D. C.

AIC CHAPTER AREAS

This map indicates approximately the present areas contained in the AIC Chapters.

Proposed Chapter Areas



The Committee on Chapter Activities recommends that Chapter areas be rearranged approximately as shown here, and it will present these recommendations at the December 9th meeting of the National Council. "X's" indicate the site of possible future new Chapters. "X's" enclosed in circles represent the "capitals" of present Chapters or of Chapters now being formed. The Committee would like to emphasize that more members will receive more benefits, if both the number of Chapters and the number of members in each Chapter are increased.

Now . . . for fast, flexible gas-liquid chromatography

Here, magnified 16 times, is Chromosorb, the specially screened and treated diatomite aggregate that facilitates partition chromatography.

Johns-Manville CHROMOSORB

CHROMOSORB® gives you sharp separations and symmetrical peaks in the gas-liquid partition method of vapor chromatography. Among its many desirable properties are high absorption, stable uniform granules, easier packing, lower pressure drop, improved resolution and inertness. And, with Chromosorb's physical stability and non-adsorption, the same column packing can be used over and over.

Carefully processed from the world's purest commercially available diatomite deposit, Chromosorb is an outgrowth of the use of Celite filter aids in the earliest gas chromatography studies. For further information, write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

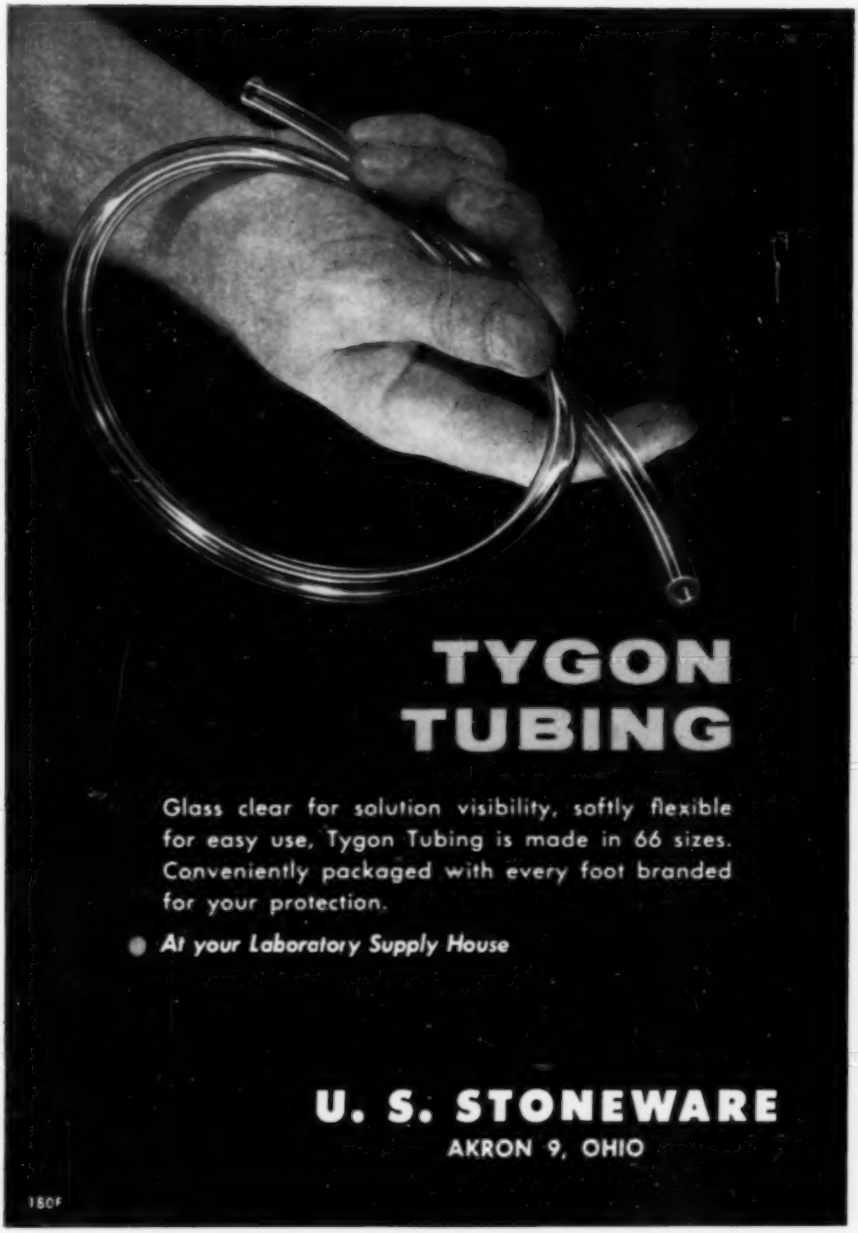
Typical Chromosorb Properties

Color	light pink
Density—loose weight—lb/cu ft	24
Specific Gravity—true	2.15
Absorption—% by weight, water	90
Moisture—% by weight, maximum	1.0
Surface Area—sq. m/gm, average	3-5
Adsorption	negligible

JOHNS MANVILLE JM PRODUCTS

Johns-Manville CHROMOSORB

a product of the Celite Division


TYGON
TUBING
Glass clear for solution visibility, softly flexible for easy use, Tygon Tubing is made in 66 sizes. Conveniently packaged with every foot branded for your protection.
At your Laboratory Supply House
U. S. STONEWARE
AKRON 9, OHIO
180F